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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,275	03/26/2004	Jayanta Basak	JP920030278US1	2158

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EXAMINER	
KENNEDY, ADRIAN L	

ART UNIT	PAPER NUMBER
2121	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,275	BASAK ET AL.	
	Examiner	Art Unit	
	Adrian L. Kennedy	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2004* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/26/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Examiner's Detailed Office Action

1. This Office Action is responsive to application **10/811,275** filed **March 26, 2004**.

2. **Claims 1, 3, 5 and 7** were amended.

3. **Claims 8-15** were added.

4. **Claims 1-15** will be examined.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 4-8, 10-12 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidya et al. (Privacy-Preserving K-Means Clustering over Vertically Partitioned Data) in view of Kothari et al. (Learning from Labeled and Unlabeled Data).

Regarding claims 1:

Vaidya et al. teaches,

A method for classifying vertically partitioned data (Page 206, Right Column, Paragraph 2; "*k-means clustering*" and "*we assume vertically partitioned data*") comprising the steps of:

categorizing (Page 206, Abstract; "*clustering*") subsets of classifiers (Page 206, Abstract; "*cluster of each entity*"; The examiner takes the position that the clusters of entities, taught in the invention of Vaidya et al., are equivalent to the "subsets". This position is supported by the fact that the clusters of entities contain attributes, and the subsets of classifiers contain attributes.) for the partitioned data;

determining class labels for a data pattern (Page 206, Abstract; "*each site learns the cluster of each entity*"; The examiner takes the position that the learning of the clusters of the entities, taught in the invention of Vaidya et al., is equivalent to the learning of "class labels" for a "data pattern". This position is supported by the examiner's assertion that the cluster of an entity is the "label" for that particular entities "pattern".) of the partitioned data for which the subsets of classifiers are consistent (Page 207; Left Column, Paragraph 1; "*Each item is placed in its closest cluster, and the cluster centers are then adjusted based on the data placement. This repeats until the positions stabilize*"; The examiner takes the position that the applicant's claimed "consistent subsets of classifiers" would have been obvious over Vaidya et al. teaching the use of stabilized clusters.);

Vaidya et al. does not teach the estimating or approximating of probabilities. However, Kothari et al. does teach,

estimating posterior probabilities (Page 2804, Left Column, Paragraph 2; "*estimated class conditional densities*") for the class labels of classifier subsets (Page 2804, Left Column, Paragraph 2; "*class membership of the unlabeled patterns*"); and

approximating the posterior probability of the partitioned data based upon the estimated posterior probabilities of the classifier subsets (Page 2804, Left Column, Paragraph 2; "*class conditional densities after the assignment leads to a maximum a posteriori (MAP) classification*").

It would have been obvious to one skilled in the art at the time of invention to combine the teachings of Vaidya et al. with the teachings of Kothari et al. for the purpose of learning from labeled and unlabeled data.

Regarding claims 2:

Vaidya et al. teaches,

The method further comprising the step of using a predetermined consistency condition for a classifier with respect to other classifiers (Page 207; Left Column, Paragraph 4; "*specifically computing which cluster gives the minimum d(i, μ_j) requires cooperation between the sites*").

Regarding claims 4:

Kothari et al. teaches,

The method wherein the posterior probability is approximated from the estimated posterior probabilities using a Bayesian framework (Page 2804, Right Column, Paragraph 4; "*Bayes theorem relates the prior and class conditional densities to the posterior probabilities*").

Regarding claims 5:

Kothari et al. teaches,

> The method wherein the class label is selected for the test data for which a combined posterior probability is maximum (Page 2804, Left Column, Paragraph 2; "*the estimated class conditional densities after the assignment leads to a maximum a posteriori (MAP) classification*").

Regarding claims 6:

Vaidya et al. teaches,

> A computer program product for classifying partitioned data comprising computer software recorded on a computer-readable medium for performing the steps of (The examiner asserts that it would have been obvious to one skilled in the art to claim the invention of Vaidya et al. being a "computer program product".):
>
> > categorizing (Page 206, Abstract; "*clustering*") subsets of classifiers (Page 206, Abstract; "*cluster of each entity*"; The examiner takes the position that the clusters of entities, taught in the invention of Vaidya et al., are equivalent to the "subsets". This position is supported by the fact that the clusters of entities contain attributes, and the subsets of classifiers contain attributes.) for the partitioned data;
> >
> > determining class labels for a data pattern (Page 206, Abstract; "*each site learns the cluster of each entity*"; The examiner takes the position that the learning of the clusters of the entities, taught in the invention of Vaidya et al., is equivalent to

the learning of "class labels" for a "data pattern". This position is supported by the examiner's assertion that the cluster of an entity is the "label" for that particular entities "pattern".) of the partitioned data for which the subsets of classifiers are consistent (Page 207; Left Column, Paragraph 1; "*Each item is placed in its closest cluster, and the cluster centers are then adjusted based on the data placement. This repeats until the positions stabilize*"; The examiner takes the position that the applicant's claimed "consistent subsets of classifiers" would have been obvious over Vaidya et al. teaching the use of stabilized clusters.);

Vaidya et al. does not teach the estimating or approximating of probabilities. However, Kothari et al. does teach,

estimating posterior probabilities (Page 2804, Left Column, Paragraph 2; "*estimated class conditional densities*") for the class labels of consistent classifier subsets (Page 2804, Left Column, Paragraph 2; "*class membership of the unlabeled patterns*"); and

approximating the posterior probability of the partitioned data based upon the estimated posterior probabilities of the consistent classifier subsets (Page 2804, Left Column, Paragraph 2; "*class conditional densities after the assignment leads to a maximum a posteriori (MAP) classification*").

It would have been obvious to one skilled in the art at the time of invention to combine the teachings of Vaidya et al. with the teachings of Kothari et al. for the purpose of learning from labeled and unlabeled data.

Regarding claims 7:

Vaidya et al. teaches,

A computer system for classifying partitioned data comprising computer software recorded on a computer-readable medium for said computer system (The examiner asserts that it would have been obvious to one skilled in the art to claim the invention of Vaidya et al. being "computer software recorded on a computer-readable medium".) comprising:

computer software code means for categorizing (Page 206, Abstract; "*clustering*") subsets of classifiers (Page 206, Abstract; "*cluster of each entity*"; The examiner takes the position that the clusters of entities, taught in the invention of Vaidya et al., are equivalent to the "subsets". This position is supported by the fact that the clusters of entities contain attributes, and the subsets of classifiers contain attributes.) for the partitioned data;

computer software code means for determining class labels for a data pattern (Page 206, Abstract; "*each site learns the cluster of each entity*"; The examiner takes the position that the learning of the clusters of the entities, taught in the invention of Vaidya et al., is equivalent to the learning of "class labels" for a "data pattern". This position is supported by the examiner's assertion that the cluster of an entity is the "label" for that particular entities "pattern".) of the partitioned data for which the classifier subsets are consistent (Page 207; Left Column, Paragraph 1; "*Each item is placed in its closest cluster, and the cluster centers are then adjusted based on the data placement. This repeats until the*

positions stabilize"; The examiner takes the position that the applicant's claimed "consistent subsets of classifiers" would have been obvious over Vaidya et al. teaching the use of stabilized clusters.);

Vaidya et al. does not teach the estimating or approximating of probabilities. However, Kothari et al. does teach,

computer software code means for estimating posterior probabilities (Page 2804, Left Column, Paragraph 2; "*estimated class conditional densities*") for the class labels of consistent classifier subsets (Page 2804, Left Column, Paragraph 2; "*class membership of the unlabeled patterns*"); and

computer software code means for approximating the posterior probability of the partitioned data based upon the estimated posterior probabilities of the consistent classifier subsets (Page 2804, Left Column, Paragraph 2; "*class conditional densities after the assignment leads to a maximum a posteriori (MAP) classification*").

It would have been obvious to one skilled in the art at the time of invention to combine the teachings of Vaidya et al. with the teachings of Kothari et al. for the purpose of learning from labeled and unlabeled data.

Regarding claims 8:

Vaidya et al. teaches,

The computer program product further comprising the step of using a predetermined consistency condition for a classifier with respect to other classifiers (Page 207; Left

Column, Paragraph 4; "*specifically computing which cluster gives the minimum d(i, μ_j) requires cooperation between the sites*").

Regarding claims 10:

Kothari et al. teaches,

The computer program product wherein the posterior probability is approximated from the estimated posterior probabilities using a Bayesian framework (Page 2804, Right Column, Paragraph 4; "*Bayes theorem relates the prior and class conditional densities to the posterior probabilities*").

Regarding claims 11:

Kothari et al. teaches,

The computer program product wherein the class label is selected for test data for which a combined posterior probability is maximum (Page 2804, Left Column, Paragraph 2; "*the estimated class conditional densities after the assignment leads to a maximum a posteriori (MAP) classification*").

Regarding claims 12:

Vaidya et al. teaches,

The computer system further comprising computer software code means for using a predetermined consistency condition for a classifier with respect to other classifiers (Page 207; Left Column, Paragraph 4; "*specifically computing which cluster gives the minimum*

d(i, μ_j) requires cooperation between the sites").

Regarding claims 14:

Kothari et al. teaches,

> The computer system wherein the posterior probability is approximated from the estimated posterior probabilities using a Bayesian framework (Page 2804, Right Column, Paragraph 4; "*Bayes theorem relates the prior and class conditional densities to the posterior probabilities*").

Regarding claims 15:

Kothari et al. teaches,

> The computer system wherein the class label is selected for test data for which a combined posterior probability is maximum (Page 2804, Left Column, Paragraph 2; "*the estimated class conditional densities after the assignment leads to a maximum a posteriori (MAP) classification*").

Allowable Subject Matter

Claims 3, 9 and 13 which have not been rejected under the prior art, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any base claim or any intervening claims. Specifically, the examiner has found no prior art which teaches the applicant's claimed "mutual consistency", where the "mutual consistency" is disclosed as satisfying the conditions of

Equation 2 in Paragraph 0021 of the applicant's disclosure for all classifiers in a subset, as disclosed in Paragraph 0024 of the applicant's disclosure.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kargupta et al (USPN 6,708,163) is cited for his collective data mining from distributed, vertically partitioned feature space. Kothari et al. is cited for his learning from labeled and unlabeled data using a minimal number of queries. Du et al. is cited for his decision tree classifier on private data.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adrian L. Kennedy whose telephone number is (571) 270-1505. The examiner can normally be reached on Mon -Fri 8:30am-5pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on (571) 272-3687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ALK

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